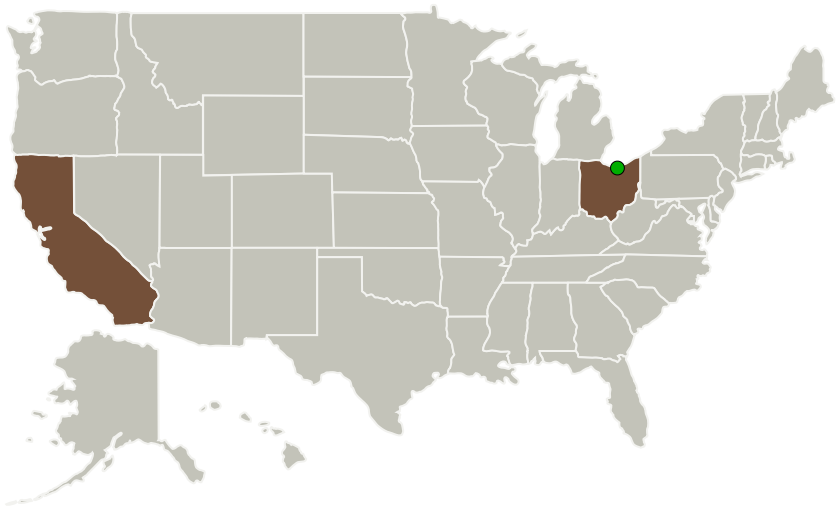
Solid State Large Area Pulsed Solar Simulator for 3-, 4- and 6-Junction Solar Cell Arrays, Phase I

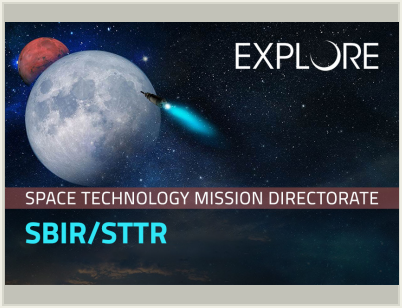
Completed Technology Project (2014 - 2014)

Project Introduction

The ssLAPSS expands on the SOP LAPSS by upgrading the light sources to enable future solar cell technologies while maintaining all of the current, proven calibration and test methods. The ssLAPSS enables testing of current SOP 3-junction cells and also upcoming 4- and 6-junction solar cells. The ssLAPSS uses planar arrays of 6 different wavelength LEDs located in close proximity to the string under test in the solar array. The individual LED intensity control gives great flexibility to meet power and spatial uniformity requirements. The LED sources are selected to each illuminate one junction in a 6-junction cell. The same LEDs will also be used for 3- and 4-junction cells. This means that one ssLAPSS can measure the current (3-junction) and future (4- and 6-junction) cells. This technology is also highly flexible so that cells with an even greater number of junctions or cells with different spectral divisions could be measure by producing a ssLAPSS with a greater number of LEDs or a different spectral mix of LEDs in the illumination array. In addition to providing 3-, 4- and 6-junction cell capability at lower systems costs than the SOP LAPSS, the ssLAPSS also has many other benefits: it requires minimal clean room floor space, it can provide low light levels (LILT), it can measure arrays in horitozontal orientations, it can scale to any bus voltage or string length, it uses proven standards and test methods and it provides for easier calibration than the SOP LAPSS. Four- and 6- junction LAPSS technology is necessary to evaluate, test and fly advanced solar cell technologies. The ssLAPSS extends an essential, proven measurement method to the future of space power conversion technologies.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Angstrom Designs, Inc.	Lead Organization	Industry	Santa Barbara, California
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
California	Ohio

Project Transitions

June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140590)*

Images

Briefing Chart
Solid State Large Area Pulsed Solar Simulator for 3-, 4- and 6-Junction Solar Cell Arrays, Phase I
(https://techport.nasa.gov/image/136441)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Angstrom Designs, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Casey P Hare

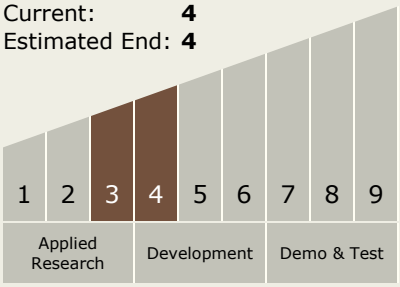
Co-Investigator:
Casey Hare

Solid State Large Area Pulsed Solar Simulator for 3-, 4- and 6-Junction Solar Cell Arrays, Phase I

Completed Technology Project (2014 - 2014)

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System